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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/634,139

08/04/2003

Ilya V. Karpov

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21906

7590

12/28/2004

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EXAMINER

LE, DUNG ANH

ART UNIT

PAPER NUMBER

2818

DATE MAILED: 12/28/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/634,139	<b>Applicant(s)</b> KARPOV, ILYA V.	
	<b>Examiner</b> DUNG A LE	<b>Art Unit</b> 2818	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**.      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 11-32 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 11-32 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date ____. | 6) <input type="checkbox"/> Other: ____.  |

DETAILED ACTION

**Claims 1- 10 have been cancelled.**

***Oath/Declaration***

The oath/declaration filed on 8/4/2003 is acceptable.

***Information Disclosure Statement***

This office acknowledges of the following items from the Applicant:

Information Disclosure Statement (IDS) filed on 8/4/2003 and made of record .

The references cited on the PTOL 1449 form have been considered.

***Specification***

The specification has been checked to the extent necessary to determine the presence of all possible minor errors. However, the applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

***Claim Rejections***

**Set of claims 11- 21**

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

**Claims 11, 14- 21 are rejected under 35 USC 102 (b) as being anticipated by Johnson et al. 6791102.**

Johnson et al. teaches a memory comprising: an insulator over a substrate 630, said insulator including a pore (fig. 15) having an electrode 680/690 over the substrate and a phase change material 720 over the electrode, wherein the phase change material fills less of the pore than the electrode (fig. 22).

**Regarding claim 14** , wherein said phase change material 720 is entirely contained within the pore.(fig. 22).

**Regarding claim 15**, wherein said phase change material 720 is a chalcogenide.

**Regarding claim 16**, said electrode to act as a heater to heat said phase change material (col 10, lines 45-50).

**Regarding claim 17**, wherein the phase change material 720 is substantially coplanar with the upper surface of said insulator 620.

**Regarding claim 18**, including a select device coupled to said electrode (fig. 23)

**Regarding claim 19**, including a conductive line formed over said insulator 730/740 and said phase change material 720.

**Regarding claim 20**, wherein said phase change material is in contact with said conductive line 770.

**Regarding claim 21**, wherein said conductive line 770 and the upper surface of said electrode are substantially parallel.

### **Claim Rejections - 35 USC § 103**

**The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:**

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

**Claims 12 and 13 are rejected under 35 U.S.C. 103 (a) as being unpatentable over Johnson et al. (6791102) in view of and the following remark.**

Regarding claims 12 and 13, Johnson et al. disclosed the claimed invention as applied to claims 1, Johnson teaches in fig. 22, phase change is about 40 percent the pore, except for the phase change material fills less than 25 percent of the pore and phase change material fills about 10 percent or less of the pore as cited in current claims 12 and 13.

It would have been obvious to one having ordinary skill in the art at the time of the invention was made to form the phase change material fills less than 25 percent of the pore and phase change material fills about 10 percent or less of the pore, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art.

**Set of claims 22- 24**

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

**Claims 22 are rejected under 35 USC 102 (b) as being anticipated by Johnson et al. 6791102.**

Johnson et al. teaches system (fig. 23) comprising:

- a processor-based device;
- a wireless interface coupled to said processor-based device ; and
- a semiconductor memory coupled to said device, said memory including an insulator over a substrate, said insulator including a pore having an electrode over the substrate and a phase change material over the electrode wherein the phase change material fills less of the pore than the electrode (fig. 22).

### **Claim Rejections - 35 USC § 103**

**The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:**

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

**Claims 23 and 24 are rejected under 35 U.S.C. 103 (a) as being unpatentable over Johnson et al. (6791102) in view of and the following remark.**

Johnson et al. disclosed the claimed invention as applied to claims 1, Johnson teaches (in fig. 22) phase change is about 40 percent the pore, except for the phase change material fills less than 25 percent of the pore and phase change material fills about 10 percent or less of the pore as cited in current claims.

It would have been obvious to one having ordinary skill in the art at the time of the invention was made to form the phase change material fills less than 25 percent of the pore and phase change material fills about 10 percent or less of the pore, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art.

**Set of claims 25-30**

**Claim Rejections - 35 USC § 103**

**The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:**

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

**Claims 25- 28 are rejected under 35 U.S.C. 103 (a) as being unpatentable over Johnson et al. (6791102) in view of and the following remark.**



Johnson et al. teaches a memory comprising:

an insulator 620 over a substrate 630, said insulator including a pore having an electrode 680/690 over the substrate and a phase change material 720 over the electrode, wherein the phase change material is less than the height of the pore (fig. 22)

Johnson et al. do not teach the phase change material is less than 25 percent of the height of the pore; said phase change material is about 10 percent or less of the height of the pore ; said phase change material fills less of the pore than the electrode and said phase change material fills about 10 percent or less of the pore as cited in present claims 25, 26, 27 and 28.

It would have been obvious to one having ordinary skill in the art at the time of the invention was made to form the phase change material is less than 25 percent of the height of the pore; said phase change material is about 10 percent or less of the height of the pore; said phase change material fills less of the pore than the electrode; said phase change material fills about 10 percent or less of the pore and said phase change material fills about 10 percent or less of the pore, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art.

**Regarding claim 29**, wherein said phase change material 720 is entirely contained within the pore (fig. 22).

**Regarding claim 30**, a conductive line 770 over said phase change material 720 wherein said conductive line 770 and the upper surface of said electrode 760 are substantially parallel.

**Set of claims 31- 32**

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

**Claims 31- 32 are rejected under 35 USC 102 (b) as being anticipated by Johnson et al. 6791102.**

Jonhson et al. teaches an apparatus comprising: a damascene structure, wherein the damascene structure includes a first electrode 608/609 over a substrate 630 and a phase change material 720 over the first electrode; and a second electrode 760 over the damascene structure (fig. 22).

**Regarding claim 32**, wherein the damascene structure further comprises an insulator having a pore over the substrate, wherein the first electrode 680/690 and the phase change material 720 are formed in the pore.

When responding to the office action, Applicants' are advice to provide the examiner with the line numbers and page numbers in the application and/or references cited to assist the examiner to locate the appropriate paragraphs.

A shortened statutory period for response to this action is set to expire 3 (three) months and 0 (zero) day from the day of this letter. Failure to respond within the period for response will cause the application to become abandoned (see M.P.E.P 710.02(b)).

### ***Conclusion***


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dung A. Le whose telephone number is (571) 272-1784. The examiner can normally be reached on Monday-Tuesday and Thursday 6:00am- 4:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Nelms can be reached on (571) 272-1787. The fax phone numbers for the

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organization where this application or proceeding is assigned are (703) 872-9306 for regular communications and (703) 872-9306 for After Final communications.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

DUNG A. LE   
Primary Examiner  
Art Unit 2818